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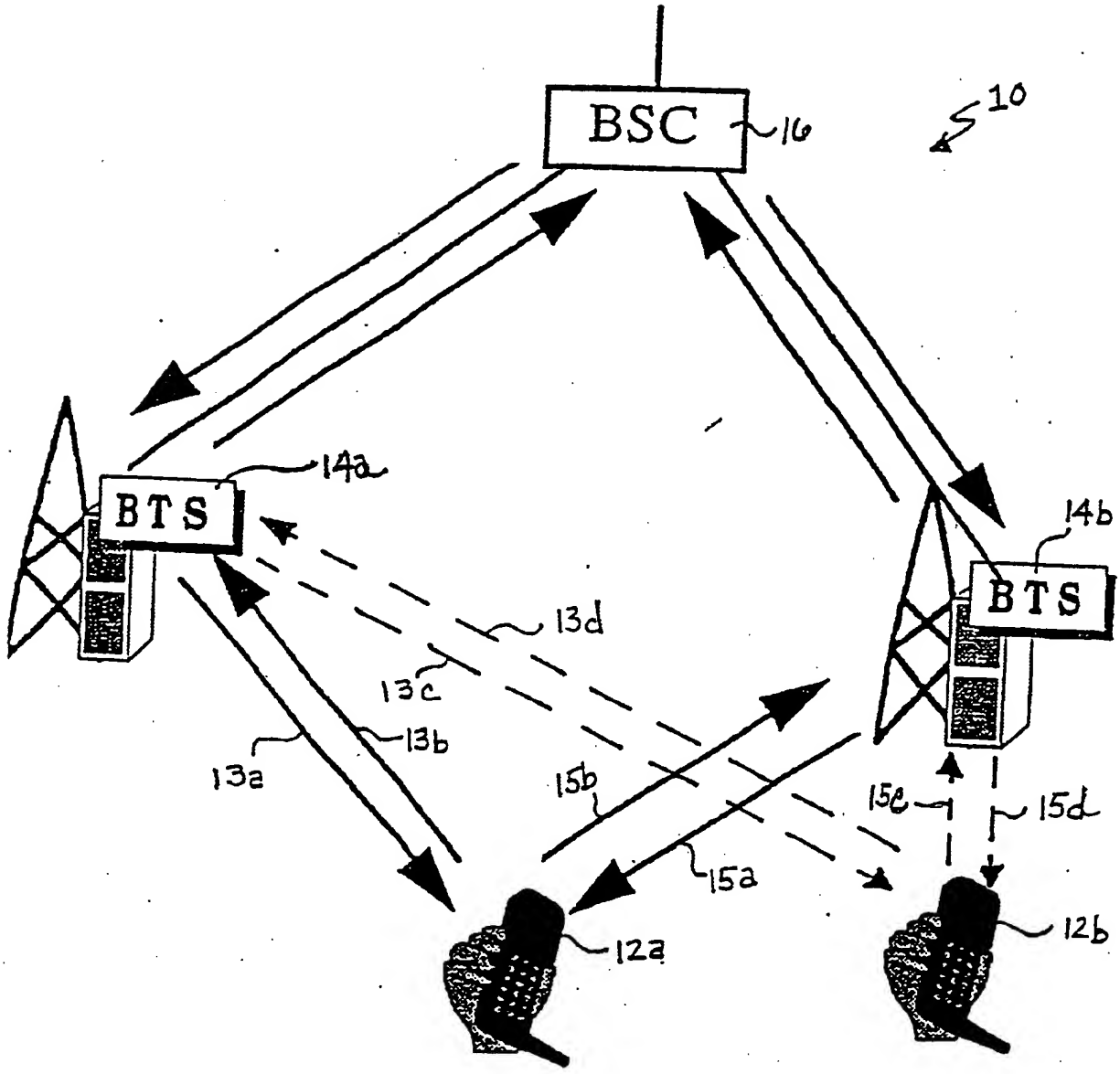

FIG. 1

09376373

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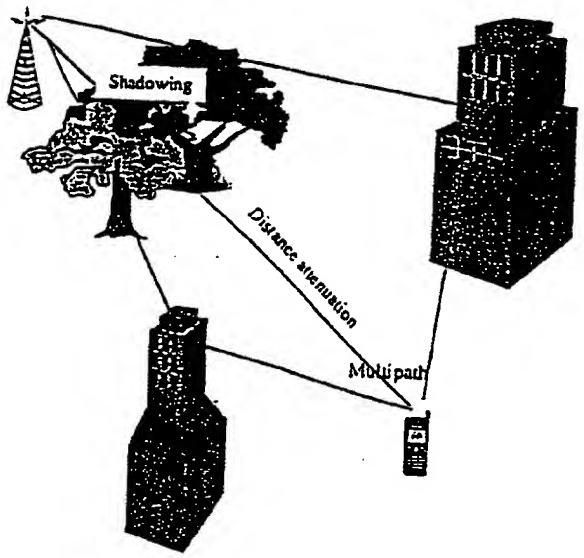

FIG. 2

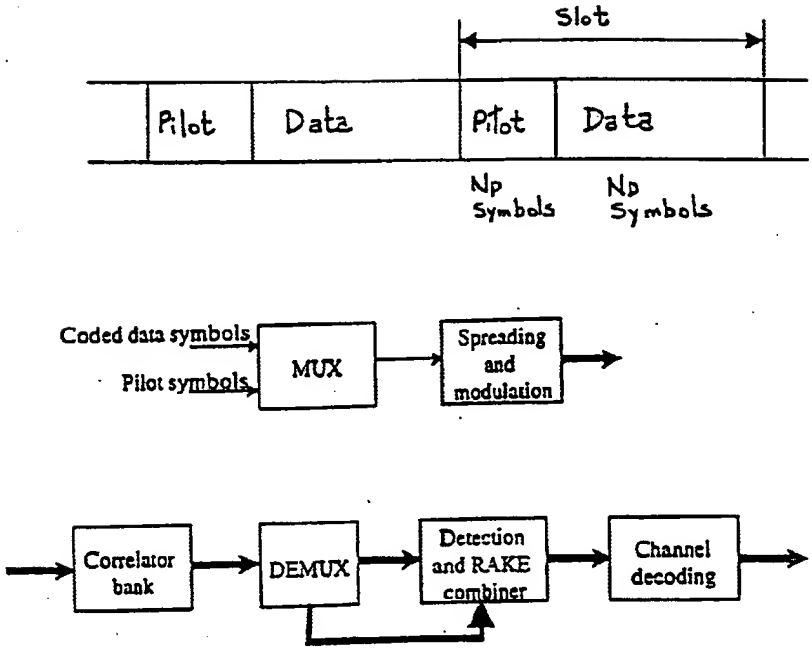

FIG. 3

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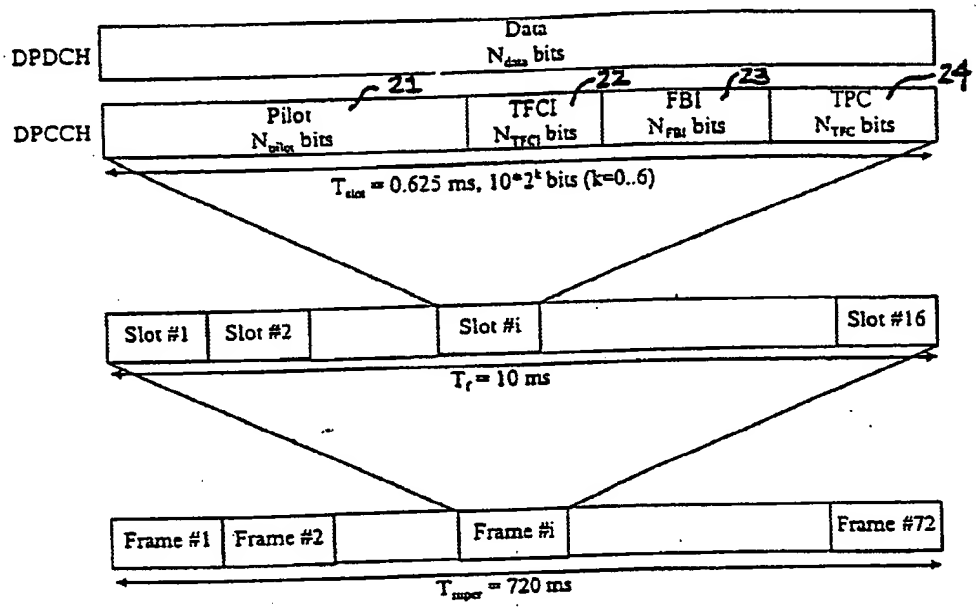

FIG. 4

Channel Bit Rate (kbps)	Channel Symbol Rate (ksps)	SF	Bits/ Frame	Bits/ Slot	N_{pilot}	N_{TPC}	N_{TFCI}	N_{FBI}
16	16	256	160	10	6	2	2	0
16	16	256	160	10	8	2	0	0
16	16	256	160	10	5	2	2	1
16	16	256	160	10	7	2	0	1
16	16	256	160	10	[6]	[2]	[0]	[2]
16	16	256	160	10	[5]	[1]	[2]	[2]

FIG. 5

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	N_{pilot} = 6						N_{pilot} = 8							
Bit #	0	1	2	3	4	5	0	1	2	3	4	5	6	7
Slot #1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	0	1	1	1	1	1	1	0	1	1
3	1	0	1	1	0	1	1	0	1	1	1	0	1	1
4	1	1	0	1	0	1	1	1	1	0	1	0	1	1
5	1	1	0	1	1	1	1	1	1	0	1	1	1	1
6	1	0	0	1	1	1	1	1	1	0	1	1	1	1
7	1	0	1	1	0	0	1	0	1	1	1	0	1	0
8	1	1	0	1	0	1	1	1	1	0	1	0	1	1
9	1	1	1	1	0	0	1	1	1	1	1	0	1	0
10	1	0	1	1	0	1	1	0	1	1	1	0	1	1
11	1	1	1	1	1	0	1	1	1	1	1	1	1	0
12	1	0	1	1	0	1	1	0	1	1	1	0	1	1
13	1	0	0	1	0	1	1	0	1	0	1	0	1	1
14	1	1	0	1	0	0	1	1	1	0	1	0	1	0
15	1	0	1	1	0	0	1	0	1	1	1	0	1	0
16	1	0	0	1	0	0	1	0	1	0	1	0	1	0

FIG. 6

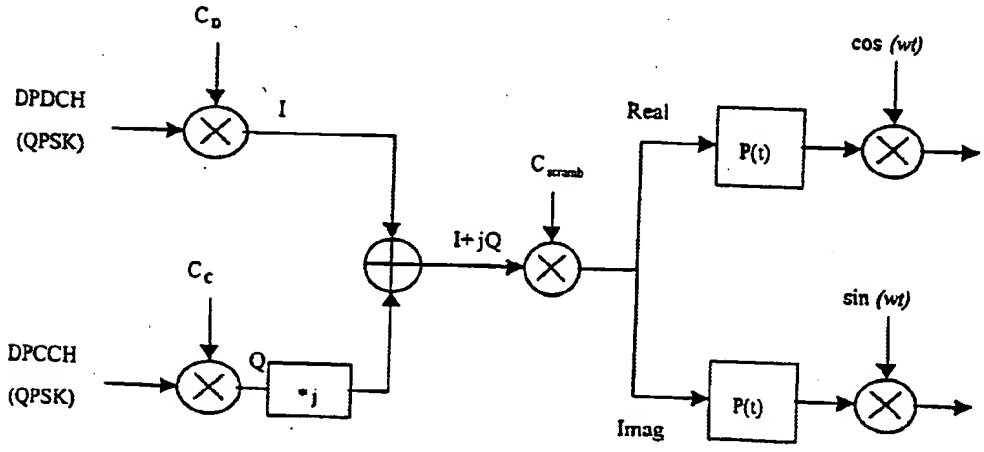

FIG. 7

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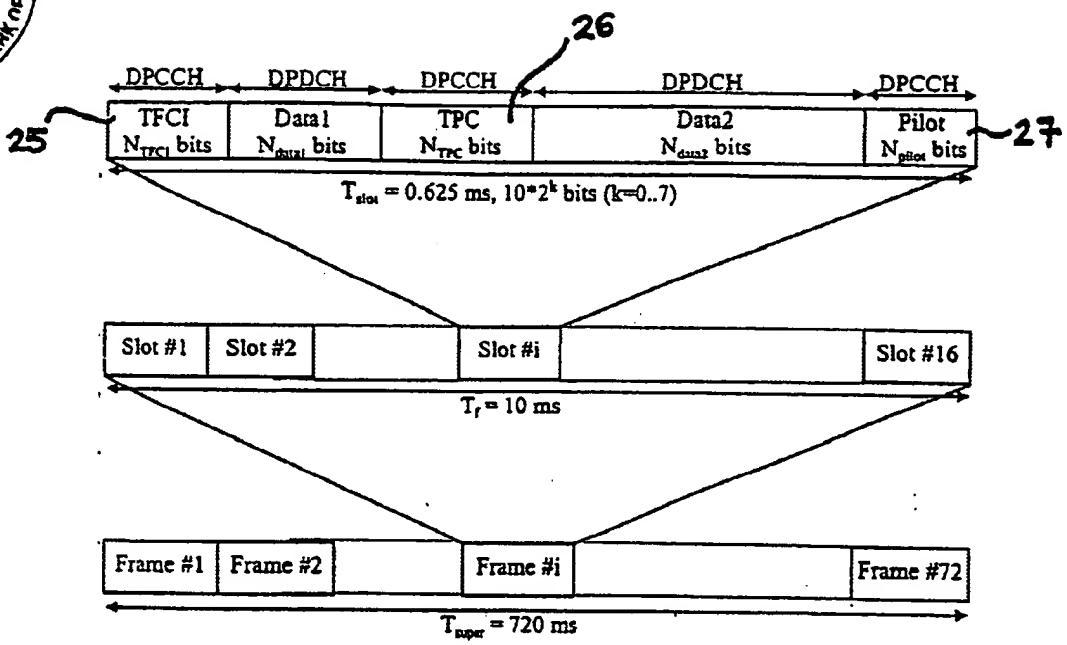

FIG. 8

Symbol rate	8ksps		16,32,64,128ksps				256,512,1024ksps							
Symbol #	0	1	0	1	2	3	0	1	2	3	4	5	6	7
Slot # 1	11	11	11	11	11	11	11	11	11	11	11	11	11	10
2	11	11	11	11	11	01	11	10	11	10	11	10	11	01
3	11	10	11	01	11	01	11	10	11	01	11	11	11	01
4	11	01	11	10	11	01	11	11	11	01	11	00	11	10
5	11	10	11	10	11	11	11	11	11	00	11	01	11	10
6	11	10	11	10	11	11	11	11	11	11	11	01	11	10
7	11	01	11	01	11	00	11	10	11	11	11	01	11	10
8	11	00	11	10	11	01	11	01	11	00	11	10	11	00
9	11	00	11	11	11	00	11	11	11	10	11	00	11	01
10	11	10	11	01	11	01	11	01	11	11	11	11	11	00
11	11	10	11	11	11	10	11	10	11	10	11	11	11	10
12	11	11	11	01	11	01	11	01	11	10	11	10	11	00
13	11	10	11	00	11	01	11	10	11	01	11	11	11	10
14	11	11	11	10	11	00	11	00	11	10	11	10	11	00
15	11	00	11	01	11	00	11	01	11	10	11	00	11	00
16	11	00	11	00	11	00	11	10	11	00	11	00	11	00

FIG. 9

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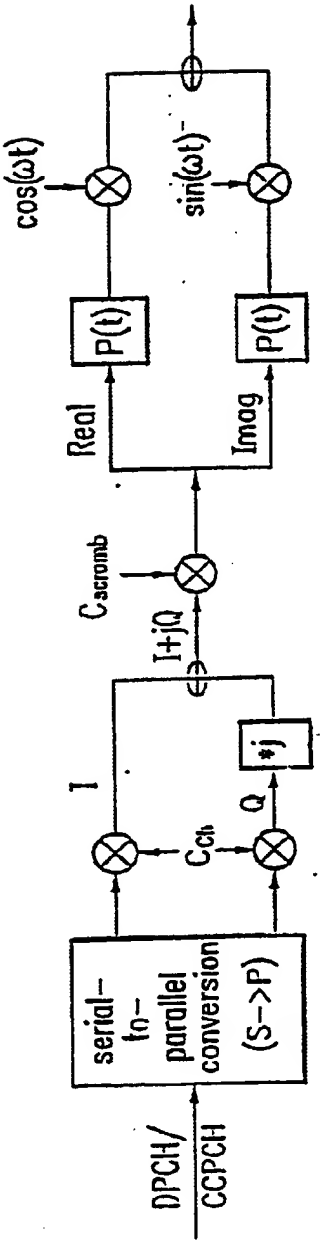
FIG. 10



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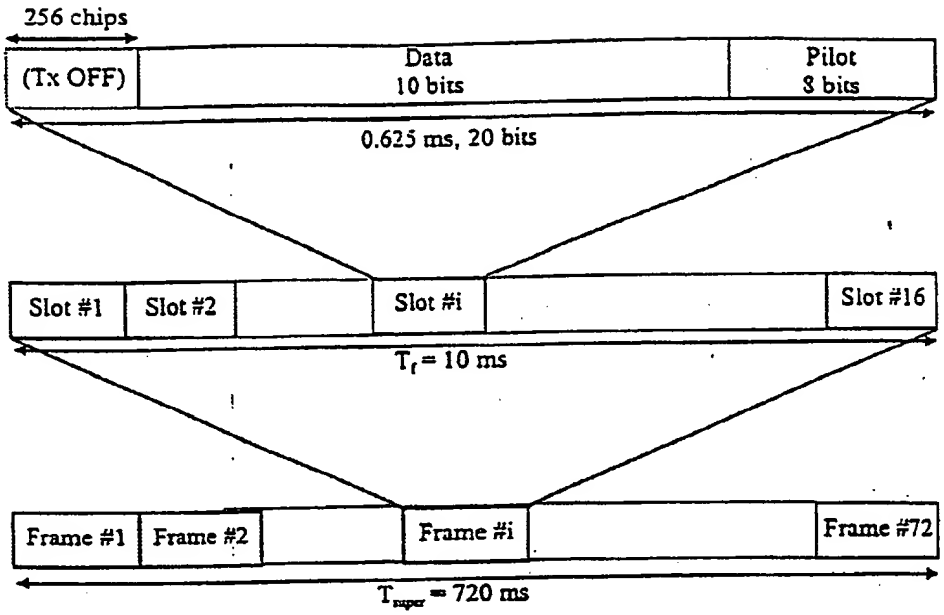

FIG. 11A

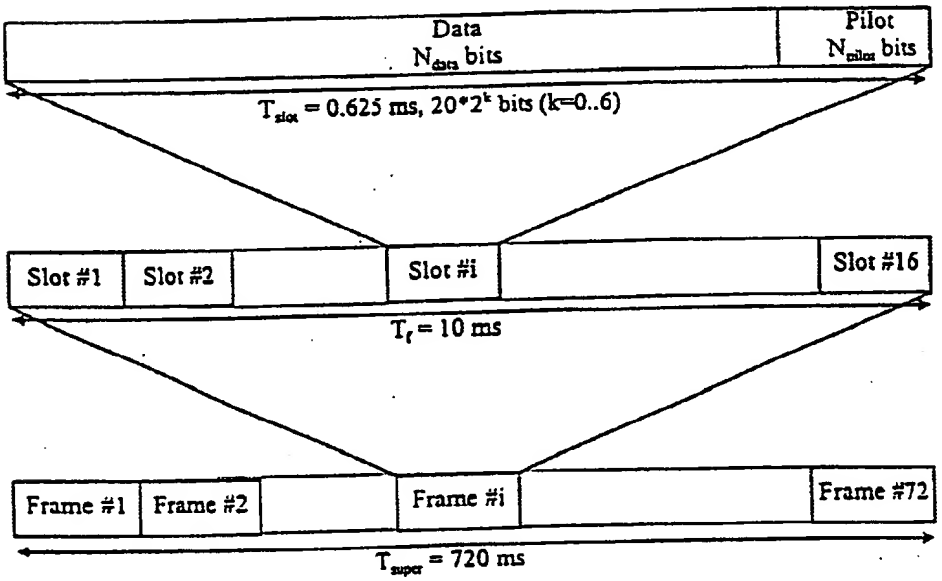

FIG. 11B

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Frame Synchronization Words	
Slot Number	1 2 3 4 5 L
C_1 = (1 1 0 1 1 1 1 1 0 0 1 0 0 0 0 0)	
C_2 = (1 0 0 0 1 0 1 0 0 1 1 1 0 1 0 1)	
C_3 = (1 1 0 1 1 1 0 0 0 0 1 0 0 0 1 1)	
C_4 = (0 1 1 1 0 1 1 0 1 0 0 0 1 0 0 1)	
C_5 = (1 0 1 1 0 0 0 0 0 1 0 0 1 1 1 1)	
C_6 = (1 1 1 0 0 1 0 1 0 0 0 1 1 0 1 0)	
C_7 = (0 1 0 0 0 0 1 1 1 0 1 0 1 1 1 0 0)	
C_8 = (1 1 1 0 1 0 0 1 0 0 0 1 0 1 1 0)	

FIG. 12A

$R(\tau)$ τ	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
$R_E(\tau)$	16	4	0	4	0	-4	0	-4	-16	-4	0	-4	0	4	0	4
$R_F(\tau)$	16	-4	0	-4	0	4	0	4	-16	4	0	4	0	-4	0	-4
$R_G(\tau)$	16	4	0	-4	0	4	0	-4	-16	-4	0	4	0	-4	0	4
$R_H(\tau)$	16	-4	0	4	0	-4	0	4	-16	4	0	-4	0	4	0	-4

R_1 R_2

FIG. 12B

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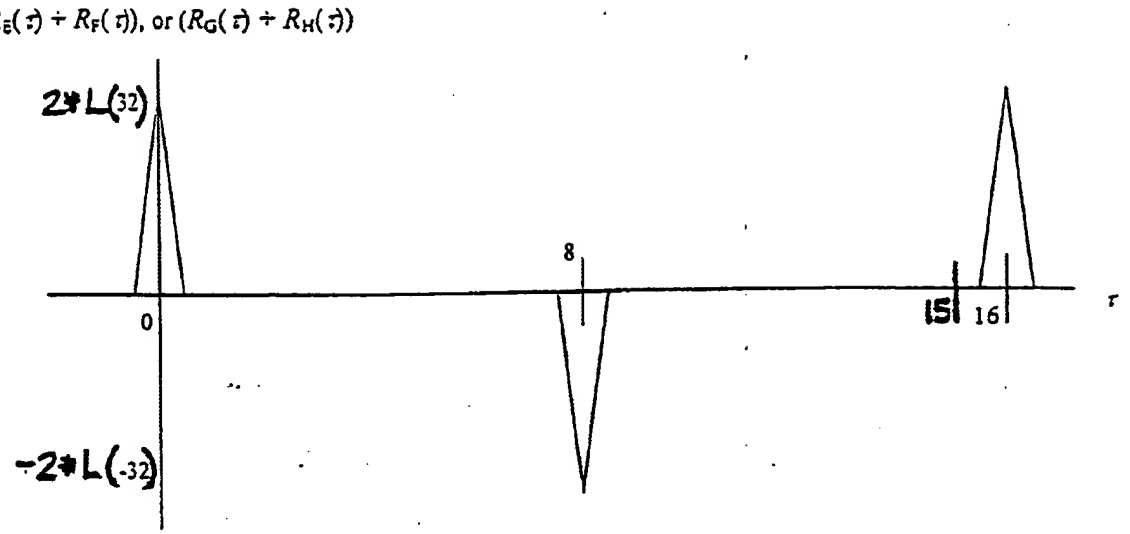

FIG. 13A

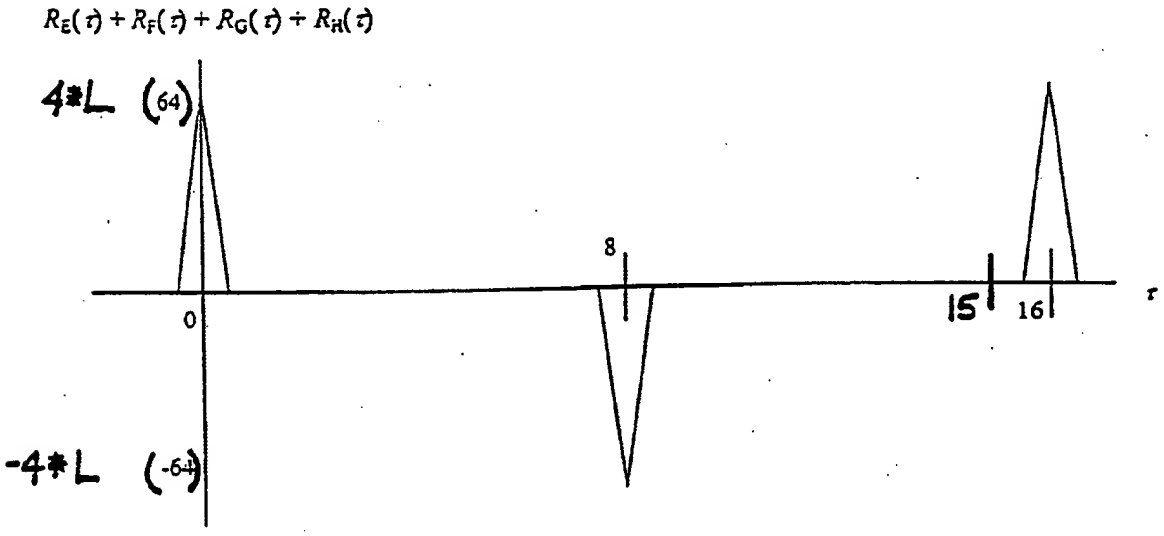

FIG. 13B

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	$N_{slot} = 5$					$N_{slot} = 6$				
Bit #	0	1	2	3	4	0	1	2	3	4
Slot #1	1	1	1	1	0	1	1	1	1	0
2	1	0	1	1	1	1	1	0	1	1
3	0	0	1	0	1	1	0	0	1	0
4	1	0	1	1	1	1	1	0	1	1
5	1	1	1	1	0	1	0	1	1	1
6	1	0	1	1	1	1	1	0	1	1
7	1	1	1	0	1	1	1	1	0	1
8	1	0	1	0	0	1	1	0	0	0
9	0	0	1	0	1	1	0	0	1	0
10	0	1	1	0	0	1	0	1	1	0
11	1	1	1	1	0	1	1	1	1	0
12	0	1	1	0	0	1	0	1	0	0
13	0	0	1	0	1	1	0	0	0	1
14	0	1	1	0	0	1	0	1	0	0
15	0	0	1	1	0	1	0	1	1	0
16	0	1	1	1	1	1	0	1	1	1

FIG. 14A

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	$N_{pilot}=7$							$N_{pilot}=8$							
Bit #	0	1	2	3	4	5	6	0	1	2	3	4	5	6	7
Slot #1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0
2	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1
3	1	0	0	1	0	1	1	1	0	1	0	1	0	1	1
4	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1
5	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0
6	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1
7	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1
8	1	1	0	1	0	0	1	1	1	1	0	1	0	1	0
9	1	0	0	1	0	1	1	1	0	1	0	1	0	1	1
10	1	0	1	1	0	0	1	1	0	1	1	1	0	1	0
11	1	1	1	1	0	1	1	1	1	1	0	1	1	1	0
12	1	0	1	1	0	0	1	1	0	1	1	1	0	1	0
13	1	0	0	1	0	1	1	1	0	1	0	1	0	1	1
14	1	0	1	1	0	0	1	1	0	1	1	1	0	1	0
15	1	0	0	1	0	0	1	1	0	1	0	1	1	1	0
16	1	0	1	1	1	1	1	1	0	1	1	1	1	1	0

FIG. 14B

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N_{pilot}	Pilot bit position #	Corresponding word of length 16
5	0	C_1
	1	C_2
	3	C_3
	4	C_4
6	1	C_1
	2	C_2
	4	C_3
	5	C_4
7	1	C_1
	2	C_2
	4	C_3
	5	C_4
8	1	C_1
	3	C_2
	5	C_3
	7	C_4

FIG. 14C

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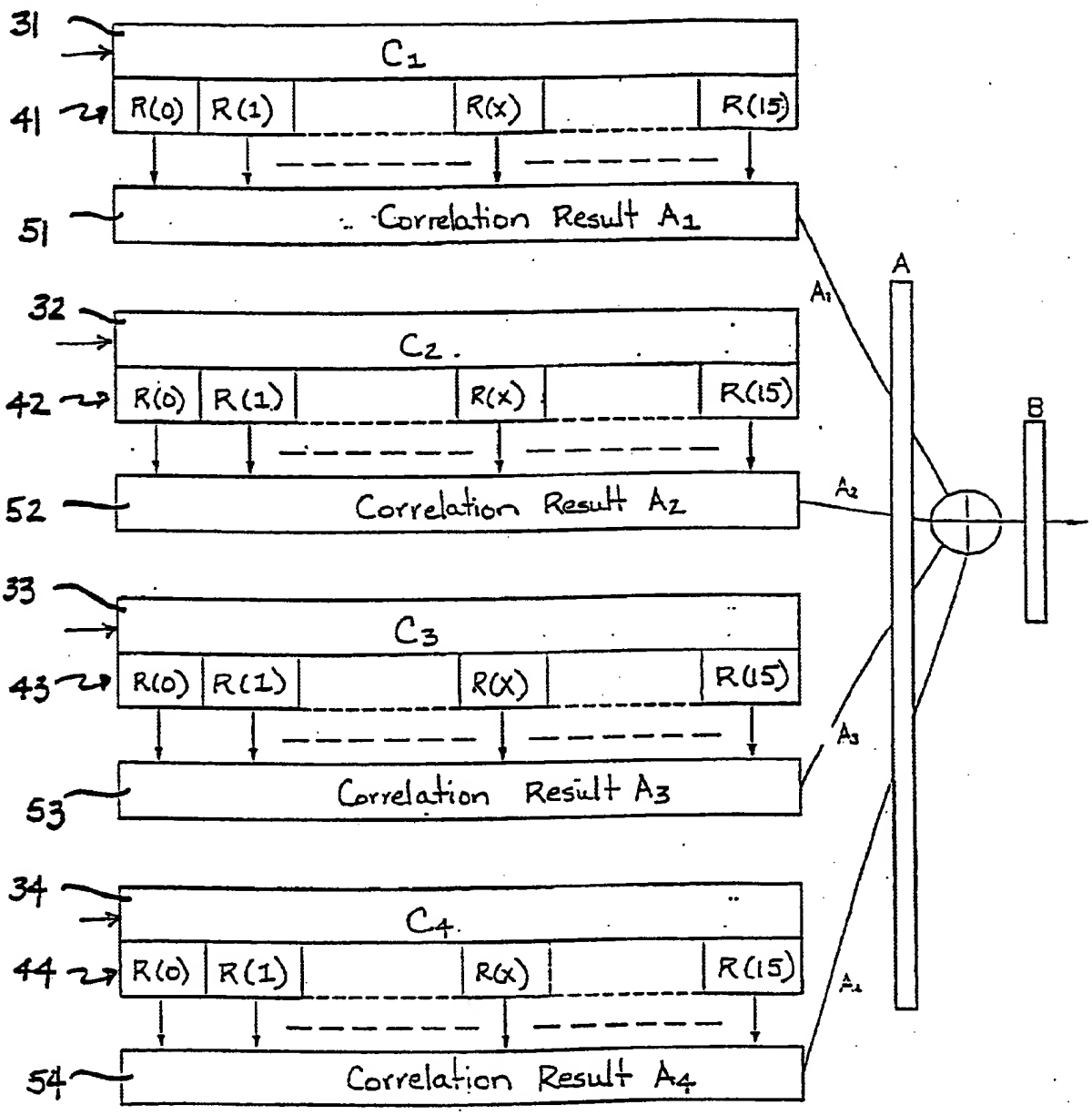

FIG. 14D

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	R_x (0)	R_x (1)	R_x (2)	R_x (3)	R_x (4)	R_x (5)	R_x (6)	R_x (7)	R_x (8)	R_x (9)	R_x (10)	R_x (11)	R_x (12)	R_x (13)	R_x (14)	R_x (15)
A_1 POINT	16	4	0	4	0	-4	0	-4	-16	-4	0	-4	0	4	0	4
A_2 POINT	16	-4	0	-4	0	4	0	4	-16	4	0	4	0	-4	0	-4
A_3 POINT	16	4	0	4	0	-4	0	-4	-16	-4	0	-4	0	4	0	4
A_4 POINT	16	-4	0	-4	0	4	0	4	-16	4	0	4	0	-4	0	-4
B POINT	64	0	0	0	0	0	0	0	-64	0	0	0	0	0	0	0

FIG. 14E

	R_x (0)	R_x (1)	R_x (2)	R_x (3)	R_x (4)	R_x (5)	R_x (6)	R_x (7)	R_x (8)	R_x (9)	R_x (10)	R_x (11)	R_x (12)	R_x (13)	R_x (14)	R_x (15)
A_1 POINT $+A_2$ POINT	32	0	0	0	0	0	0	0	-32	0	0	0	0	0	0	0
A_3 POINT $+A_4$ POINT	32	0	0	0	0	0	0	0	-32	0	0	0	0	0	0	0
A_1 POINT $+A_4$ POINT	32	0	0	0	0	0	0	0	-32	0	0	0	0	0	0	0
A_2 POINT $+$ A_3 POINT	32	0	0	0	0	0	0	0	-32	0	0	0	0	0	0	0

FIG. 14F

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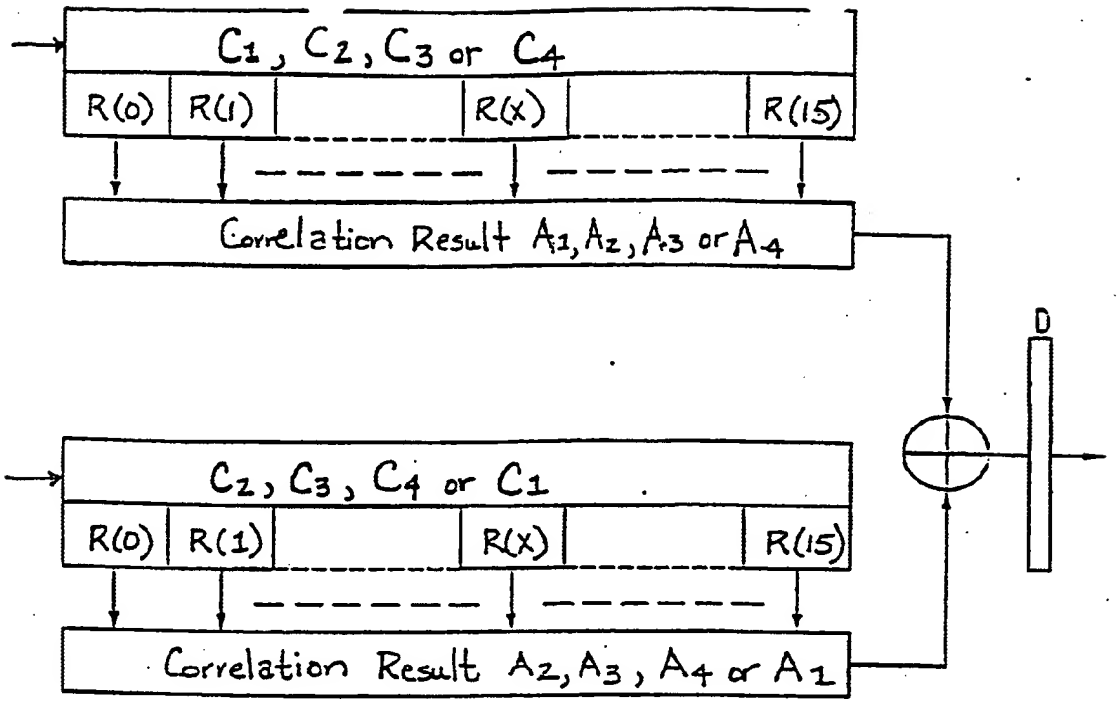

FIG. 14G

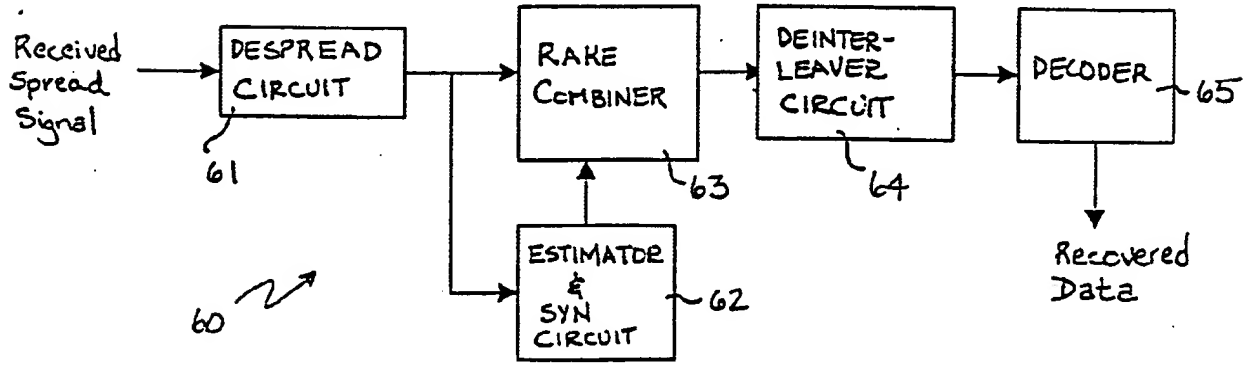

FIG. 14H

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	$R_x(0)$	$R_x(1)$	$R_x(2)$	$R_x(3)$	$R_x(4)$	$R_x(5)$	$R_x(6)$	$R_x(7)$	$R_x(8)$	$R_x(9)$	$R_x(10)$	$R_x(11)$	$R_x(12)$	$R_x(13)$	$R_x(14)$	$R_x(15)$
A_1 POINT	16	-4	-4	8	0	-4	0	0	-4	0	0	-4	0	8	-4	-4
A_2 POINT	16	0	0	-4	-4	-4	0	0	12	0	0	-4	-4	-4	0	0
A_3 POINT	16	4	0	0	4	8	8	0	0	0	8	8	4	0	0	4
A_4 POINT	16	0	4	-4	0	0	-4	4	0	4	-4	0	0	-4	4	0
B POINT	64	0	0	0	0	0	4	4	8	4	4	0	0	0	0	0

FIG. 14I

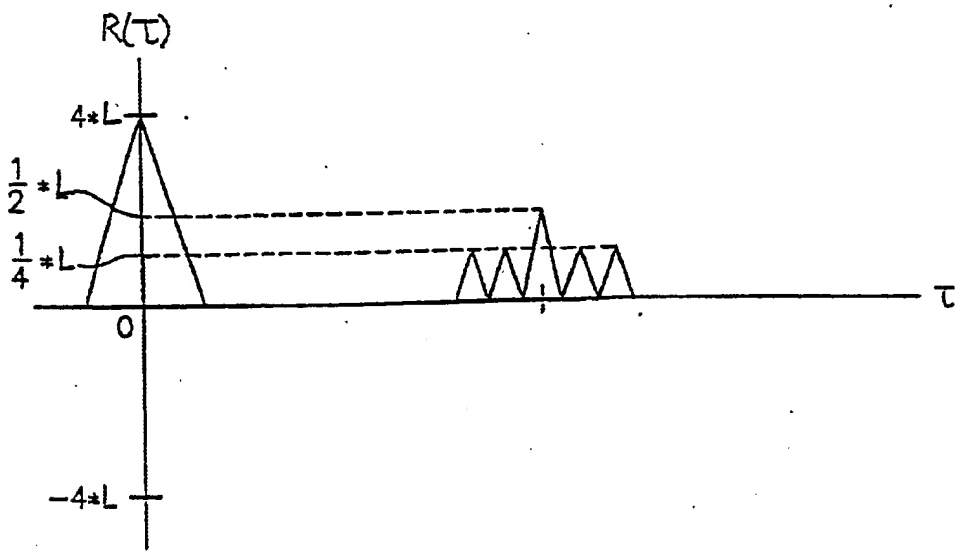

FIG. 14J

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	N_{pilot} = 4		N_{pilot} = 8				N_{pilot} = 16							
Symbol #	0	1	0	1	2	3	0	1	2	3	4	5	6	7
Slot #1	11	11	11	11	11	10	11	11	11	10	11	11	11	01
2	11	10	11	10	11	11	11	10	11	11	11	01	11	11
3	11	00	11	00	11	01	11	00	11	01	11	11	11	01
4	11	10	11	10	11	11	11	10	11	11	11	10	11	00
5	11	11	11	11	11	10	11	11	11	10	11	00	11	01
6	11	10	11	10	11	11	11	10	11	11	11	01	11	00
7	11	11	11	11	11	01	11	11	11	01	11	00	11	10
8	11	10	11	10	11	00	11	10	11	00	11	01	11	11
9	11	00	11	00	11	01	11	00	11	01	11	00	11	10
10	11	01	11	01	11	00	11	01	11	00	11	10	11	00
11	11	11	11	11	11	10	11	11	11	10	11	00	11	10
12	11	01	11	01	11	00	11	01	11	00	11	01	11	11
13	11	00	11	00	11	01	11	00	11	01	11	11	11	10
14	11	01	11	01	11	00	11	01	11	00	11	10	11	11
15	11	00	11	00	11	10	11	00	11	10	11	11	11	01
16	11	01	11	01	11	11	11	01	11	11	11	10	11	00

FIG. 15A

Symbol rate	Symbol #	Channel	Corresponding word of length L=16
N_{pilot} = 4	1	I-CH	C_1
		Q-CH	C_2
N_{pilot} = 8	1	I-CH	C_1
		Q-CH	C_2
	3	I-CH	C_3
		Q-CH	C_4
N_{pilot} = 16	1	I-CH	C_1
		Q-CH	C_2
	3	I-CH	C_3
		Q-CH	C_4
	5	I-CH	C_5
		Q-CH	C_6
	7	I-CH	C_7
		Q-CH	C_8

FIG. 15B

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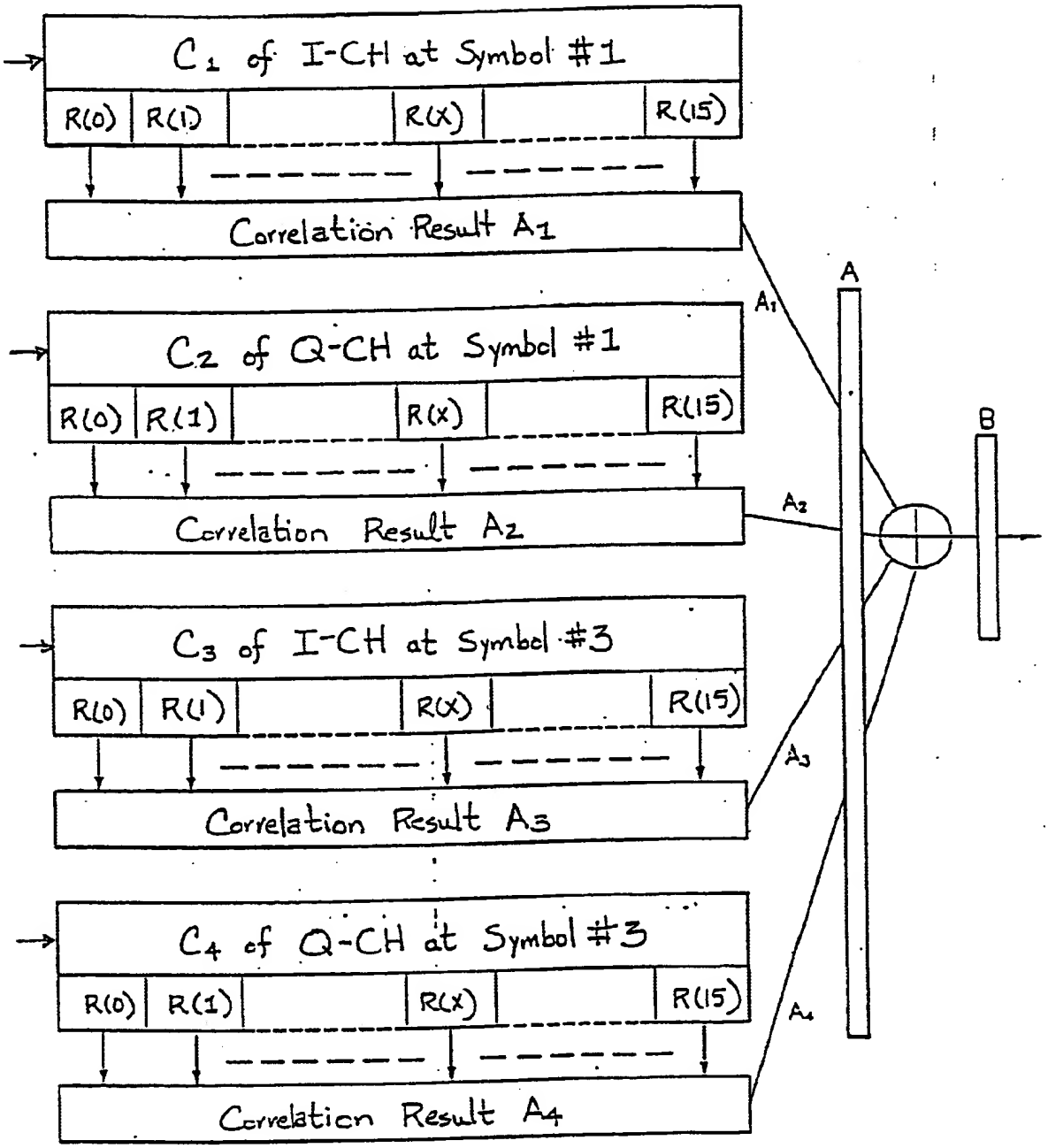

FIG. 15C

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Symbol #	0	1	2	3
Slot #1	11	11	11	10
2	11	10	11	11
3	11	00	11	01
4	11	10	11	11
5	11	11	11	10
6	11	10	11	11
7	11	11	11	01
8	11	10	11	00
9	11	00	11	01
10	11	01	11	00
11	11	11	11	10
12	11	01	11	00
13	11	00	11	01
14	11	01	11	00
15	11	00	11	10
16	11	01	11	11

FIG. 16A

Symbol #	Channel	Corresponding word of length 16
1	I-CH	C_1
	Q-CH	C_2
3	I-CH	C_3
	Q-CH	C_4

FIG. 16B

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	$N_{pilot} = 8$				$N_{pilot} = 1$							
Symbol #	0	1	2	3	0	1	2	3	4	5	6	7
Slot #1	11	11	11	10	11	11	11	10	11	11	11	01
2	11	10	11	11	11	10	11	11	11	01	11	11
3	11	00	11	01	11	00	11	01	11	11	11	01
4	11	10	11	11	11	10	11	11	11	10	11	00
5	11	11	11	10	11	11	11	10	11	00	11	01
6	11	10	11	11	11	10	11	11	11	01	11	00
7	11	11	11	01	11	11	11	01	11	00	11	10
8	11	10	11	00	11	10	11	00	11	01	11	11
9	11	00	11	01	11	00	11	01	11	00	11	10
10	11	01	11	00	11	01	11	00	11	10	11	00
11	11	11	11	10	11	11	11	10	11	00	11	10
12	11	01	11	00	11	01	11	00	11	01	11	11
13	11	00	11	01	11	00	11	01	11	11	11	10
14	11	01	11	00	11	01	11	00	11	10	11	11
15	11	00	11	10	11	00	11	10	11	11	11	01
16	11	01	11	11	11	01	11	11	11	10	11	00

FIG. 16C

Symbol rate	Symbol #	Channel	Corresponding word of length 16
$N_{pilot} = 8$	1	I-CH	C_1
		Q-CH	C_2
	3	I-CH	C_3
		Q-CH	C_4
$N_{pilot} = 16$	1	I-CH	C_1
		Q-CH	C_2
	3	I-CH	C_3
		Q-CH	C_4
	5	I-CH	C_5
		Q-CH	C_6
	7	I-CH	C_7
		Q-CH	C_8

FIG. 16D

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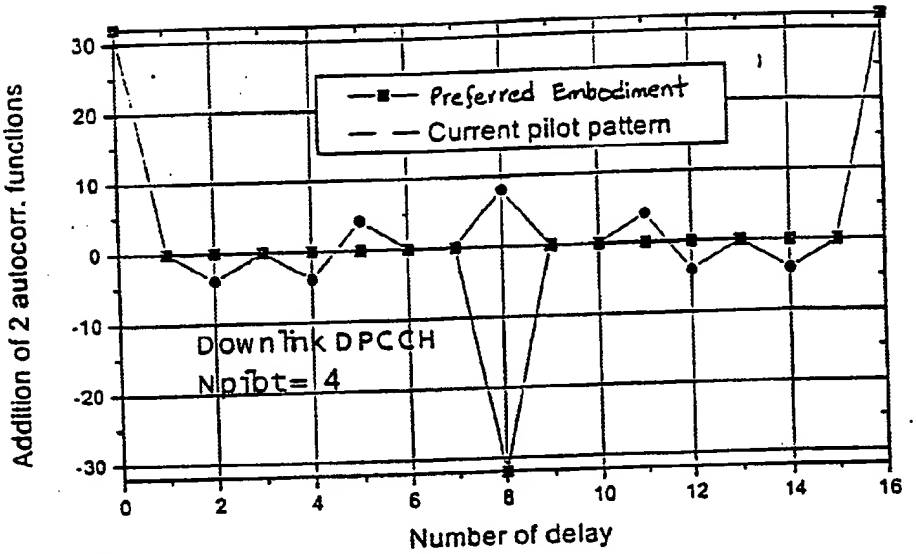

FIG. 17A

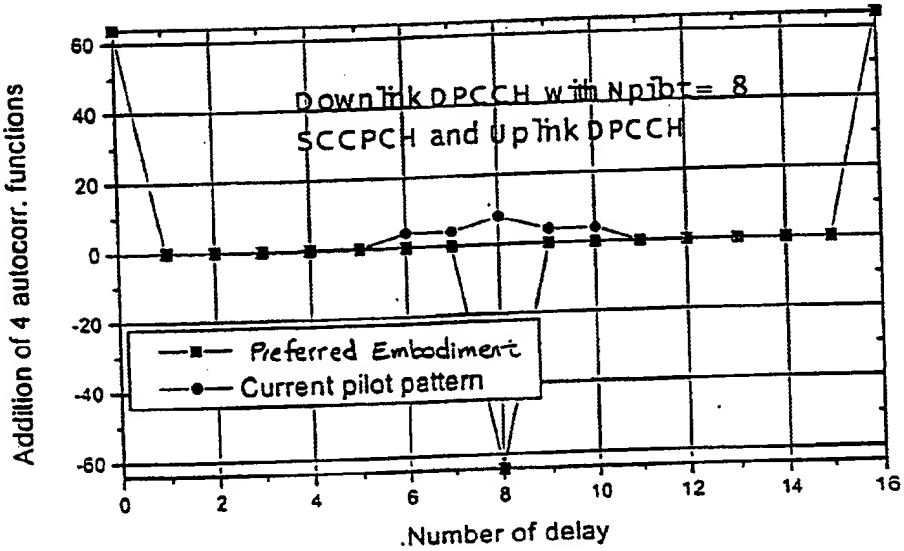

FIG. 17B

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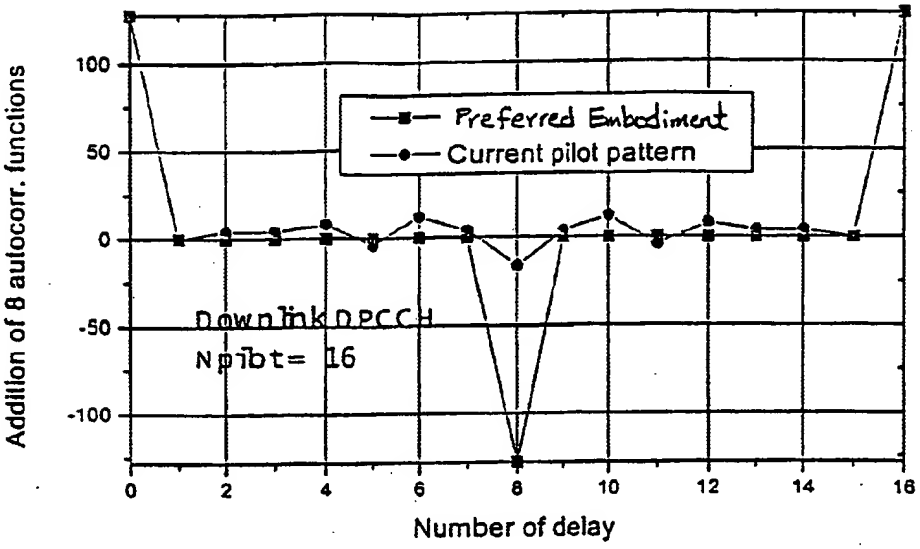

FIG. 17C

Parameters	Downlink
Slot per frame	16
Number of bits in the DPCCH (Pilot/TPC/TFCI)	4/2/0
Number of bits in the DPDCH per each slot	4
Spreding factor (DPDCH)	512
Spreding factor (DPCCH)	512
Modulation	QPSK
3dB bandwidth	4.096MHz
Shaping filter	Root raised cosine (roll off 0.22)
Power amplifier	Ideal
Propogation channel	AWGN

FIG. 18A

O·I·P·E
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PATENT & TRADEMARK OFFICE

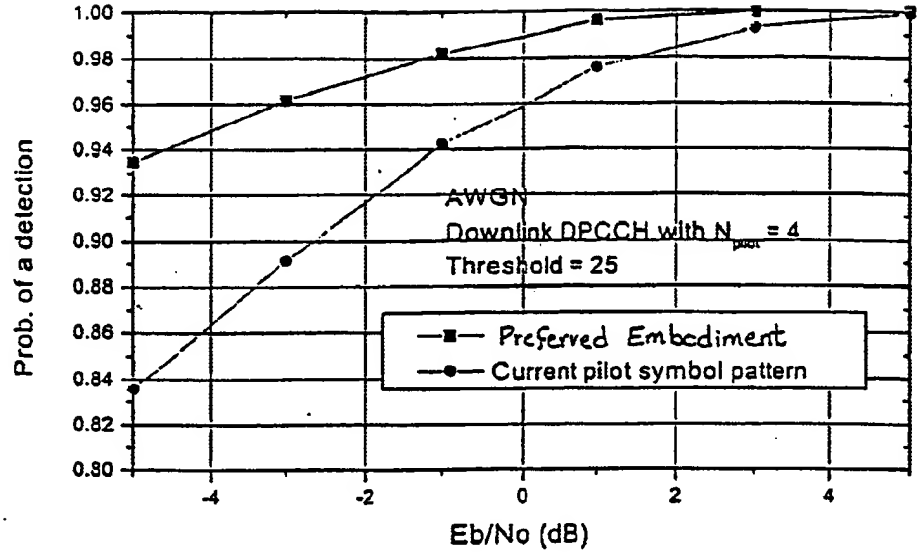

FIG. 18B

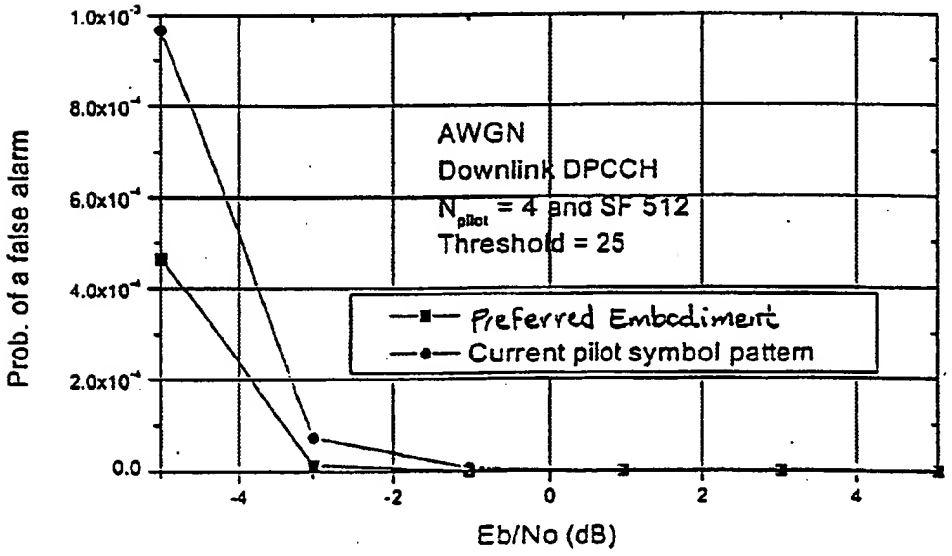

FIG. 18C

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PATENT & TRADEMARK OFFICE

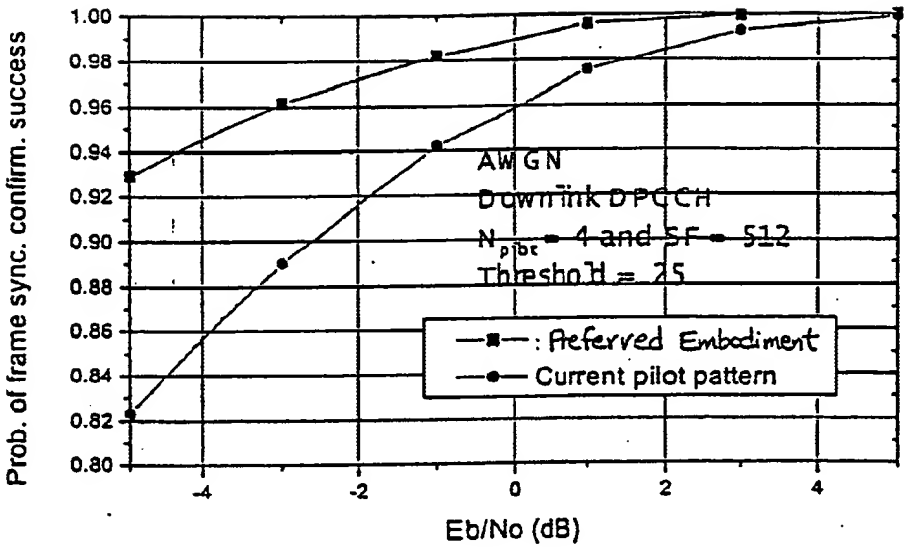

FIG. 18D

OCT 2 8 2003
TENT & TRADEMARK OFFICE

	N_{pilot} =		N_{pilot} = 8				N_{pilot} = 16							
Symbol #	0	1	0	1	2	3	0	1	2	3	4	5	6	7
Slot #1	01	10	11	00	00	10	11	00	00	10	11	11	00	10
2	00	10	11	01	00	11	11	01	00	11	11	01	00	00
3	10	10	11	11	00	01	11	11	00	01	11	11	00	10
4	00	10	11	01	00	11	11	01	00	11	11	10	00	11
5	01	10	11	00	00	10	11	00	00	10	11	11	00	01
6	00	10	11	01	00	11	11	01	00	11	11	10	00	00
7	01	10	11	11	00	10	11	11	00	10	11	00	00	01
8	00	10	11	10	00	11	11	10	00	11	11	01	00	00
9	10	10	11	11	00	01	11	11	00	01	11	00	00	01
10	11	10	11	10	00	00	11	10	00	00	11	10	00	11
11	01	10	11	00	00	10	11	00	00	10	11	00	00	01
12	11	10	11	10	00	00	11	10	00	00	11	01	00	00
13	10	10	11	11	00	01	11	11	00	01	11	00	00	10
14	11	10	11	10	00	00	11	10	00	00	11	01	00	11
15	10	10	11	00	00	01	11	00	00	01	11	11	00	10
16	11	10	11	01	00	00	11	01	00	00	11	10	00	11

FIG. 19A

Symbol rate	Symbol #	Channel	Corresponding Word of length 16
N_{pilot} = 4	0	I-CH	$-C_1$
		Q-CH	C_2
N_{pilot} = 8	1	I-CH	$-C_3$
		Q-CH	C_4
	3	I-CH	C_1
		Q-CH	$-C_2$
N_{pilot} = 16	1	I-CH	$-C_3$
		Q-CH	C_4
	3	I-CH	C_1
		Q-CH	$-C_2$
	5	I-CH	$-C_7$
		Q-CH	C_8
	7	I-CH	C_5
		Q-CH	$-C_6$

FIG. 19B

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PATENT & TRADEMARK OFFICE

Symbol #	0	1	2	3
Slot #1	11	11	00	01
2	11	10	00	00
3	11	00	00	10
4	11	10	00	00
5	11	11	00	01
6	11	10	00	00
7	11	11	00	10
8	11	10	00	11
9	11	00	00	10
10	11	01	00	11
11	11	11	00	01
12	11	01	00	11
13	11	00	00	10
14	11	01	00	11
15	11	00	00	01
16	11	01	00	00

FIG. 19C

Symbol #	Channel	Corresponding word of length 16
1	I-CH	C_1
	Q-CH	C_2
3	I-CH	$-C_3$
	Q-CH	$-C_4$

FIG. 19D

OCT 2 8 2003
TRADEMARK OFFICE

	$N_{pilot} = 8$				$N_{pilot} = 16$							
Symbol #	0	1	2	3	0	1	2	3	4	5	6	7
Slot #1	11	00	00	10	11	00	00	10	11	11	00	10
2	11	01	00	11	11	01	00	11	11	01	00	00
3	11	11	00	01	11	11	00	01	11	11	00	10
4	11	01	00	11	11	01	00	11	11	10	00	11
5	11	00	00	10	11	00	00	10	11	11	00	01
6	11	01	00	11	11	01	00	11	11	10	00	00
7	11	11	00	10	11	11	00	10	11	00	00	01
8	11	10	00	11	11	10	00	11	11	01	00	00
9	11	11	00	01	11	11	00	01	11	00	00	01
10	11	10	00	00	11	10	00	00	11	10	00	11
11	11	00	00	10	11	00	00	10	11	00	00	01
12	11	10	00	00	11	10	00	00	11	01	00	00
13	11	11	00	01	11	11	00	01	11	00	00	10
14	11	10	00	00	11	10	00	00	11	01	00	11
15	11	00	00	01	11	00	00	01	11	11	00	10
16	11	01	00	00	11	01	00	00	11	10	00	11

FIG. 19E

Symbol rate	Symbol #	Channel	Corresponding word of length 16
$N_{pilot} = 8$	1	I-CH	$-C_3$
		Q-CH	C_4
	3	I-CH	C_1
		Q-CH	$-C_2$
$N_{pilot} = 16$	1	I-CH	$-C_3$
		Q-CH	C_4
	3	I-CH	C_1
		Q-CH	$-C_2$
	5	I-CH	$-C_7$
		Q-CH	C_8
	7	I-CH	C_5
		Q-CH	$-C_6$

FIG. 19F

OCT 2 8 2003
PATENT & TRADEMARK OFFICE

Sequence	Autocorrelation
C_1=(1101111100100000)	16 4 0 4 0 -4 0 -4 -16 -4 0 -4 0 4 0 4
C_2=(1000101001110101)	16 -4 0 -4 0 4 0 4 -16 4 0 4 0 -4 0 -4
C_3=(1111101100000100)	16 4 0 4 0 -4 0 -4 -16 -4 0 -4 0 4 0 4
C_4=(0101000110101110)	16 -4 0 -4 0 4 0 4 -16 4 0 4 0 -4 0 -4
C_5=(0011101111000100)	16 4 0 -4 0 4 0 -4 -16 -4 0 4 0 -4 0 4
C_6=(0010010111011010)	16 -4 0 4 0 -4 0 4 -16 4 0 -4 0 4 0 -4
C_7=(0111000010001111)	16 4 0 -4 0 4 0 -4 -16 -4 0 4 0 -4 0 4
C_8=(1011101001000101)	16 -4 0 4 0 -4 0 4 -16 4 0 -4 0 4 0 -4
C_9=(0011011111001000)	16 4 0 4 0 -4 0 -4 -16 -4 0 -4 0 4 0 4
C_{10}=(0010100111010110)	16 -4 0 -4 0 4 0 4 -16 4 0 4 0 -4 0 -4
C_{11}=(1100000100111110)	16 4 0 4 0 -4 0 -4 -16 -4 0 -4 0 4 0 4
C_{12}=(1011100101000110)	16 -4 0 -4 0 4 0 4 -16 4 0 4 0 -4 0 -4
C_{13}=(0100001.110111100)	16 4 0 -4 0 4 0 -4 -16 -4 0 4 0 -4 0 4
C_{14}=(1000100101110110)	16 -4 0 4 0 -4 0 4 -16 4 0 -4 0 4 0 -4
C_{15}=(0000100011110111)	16 4 0 -4 0 4 0 -4 -16 -4 0 4 0 -4 0 4
C_{16}=(1001000101101110)	16 -4 0 4 0 -4 0 4 -16 4 0 -4 0 4 0 -4

FIG. 20A

$R(\tau)$ τ	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
$R_E(\tau)$	16	4	0	4	0	-4	0	-4	-16	-4	0	-4	0	4	0	4
$R_F(\tau)$	16	-4	0	-4	0	4	0	4	-16	4	0	4	0	-4	0	-4
$R_G(\tau)$	16	4	0	-4	0	4	0	-4	-16	-4	0	4	0	-4	0	4
$R_H(\tau)$	16	-4	0	4	0	-4	0	4	-16	4	0	-4	0	4	0	-4

FIG. 20B

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PATENT & TRADEMARK OFFICE

	N_{pilot} = 6						N_{pilot} = 8							
Bit #	0	1	2	3	4	5	0	1	2	3	4	5	6	7
Slot #1	1	1	1	1	1	0	1	1	1	1	1	1	1	0
2	1	1	0	1	1	1	1	1	1	0	1	1	1	1
3	1	0	0	1	1	0	1	0	1	0	1	1	1	0
4	1	1	0	1	1	1	1	1	1	0	1	1	1	1
5	1	1	1	1	1	0	1	1	1	1	1	1	1	0
6	1	1	0	1	0	0	1	1	1	0	1	0	1	0
7	1	1	1	1	1	0	1	1	1	1	1	1	1	0
8	1	1	0	1	1	1	1	1	1	0	1	1	1	1
9	1	0	0	1	0	1	1	0	1	0	1	0	1	1
10	1	0	1	1	0	0	1	0	1	1	1	0	1	0
11	1	1	1	1	0	1	1	1	1	1	1	0	1	1
12	1	0	1	1	0	0	1	0	1	1	1	0	1	0
13	1	0	0	1	0	1	1	0	1	0	1	0	1	1
14	1	0	1	1	1	1	1	0	1	1	1	1	1	1
15	1	0	0	1	0	1	1	0	1	0	1	0	1	1
16	1	0	1	1	0	0	1	0	1	1	1	0	1	0

FIG. 20C

N_{pilots}	Pilot bit position #	Corresponding word of length 16
6	1	C_1
	2	C_2
	4	C_3
	5	C_4
8	1	C_1
	3	C_2
	5	C_3
	7	C_4

FIG. 20D

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PATENT & TRADEMARK OFFICE

Symbol rate	8ksps		16,32,64,128ksps				256,512,1024ksps							
Symbol #	0	1	0	1	2	3	0	1	2	3	4	5	6	7
Slot # 1	11	11	11	11	11	10	11	11	11	10	11	00	11	01
2	11	10	11	10	11	11	11	10	11	11	11	00	11	10
3	11	00	11	00	11	10	11	00	11	10	11	11	11	11
4	11	10	11	10	11	11	11	10	11	11	11	10	11	11
5	11	11	11	11	11	10	11	11	11	10	11	10	11	01
6	11	10	11	10	11	00	11	10	11	00	11	01	11	00
7	11	11	11	11	11	10	11	11	11	10	11	10	11	01
8	11	10	11	10	11	11	11	10	11	11	11	11	11	00
9	11	00	11	00	11	01	11	00	11	01	11	11	11	10
10	11	01	11	01	11	00	11	01	11	00	11	11	11	01
11	11	11	11	11	11	01	11	11	11	01	11	00	11	00
12	11	01	11	01	11	00	11	01	11	00	11	01	11	00
13	11	00	11	00	11	01	11	00	11	01	11	01	11	10
14	11	01	11	01	11	11	11	01	11	11	11	10	11	11
15	11	00	11	00	11	01	11	00	11	01	11	01	11	10
16	11	01	11	01	11	00	11	01	11	00	11	00	11	11

FIG. 20E

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PATENT & TRADEMARK OFFICE

Symbol rate	2048,4096ksps															
Symbol #	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Slot # 1	11	11	11	10	11	00	11	01	11	00	11	11	11	01	11	01
2	11	10	11	11	11	00	11	10	11	00	11	10	11	10	11	00
3	11	00	11	10	11	11	11	11	11	11	11	01	11	00	11	00
4	11	10	11	11	11	10	11	11	11	10	11	01	11	00	11	01
5	11	11	11	10	11	10	11	01	11	01	11	01	11	01	11	10
6	11	10	11	00	11	01	11	00	11	10	11	00	11	00	11	00
7	11	11	11	10	11	10	11	01	11	10	11	00	11	10	11	00
8	11	10	11	11	11	11	11	00	11	11	11	11	11	11	11	01
9	11	00	11	01	11	11	11	10	11	11	11	00	11	10	11	10
10	11	01	11	00	11	11	11	01	11	11	11	01	11	01	11	11
11	11	11	11	01	11	00	11	00	11	00	11	10	11	11	11	11
12	11	01	11	00	11	01	11	00	11	01	11	10	11	11	11	10
13	11	00	11	01	11	01	11	10	11	10	11	10	11	10	11	01
14	11	01	11	11	11	10	11	11	11	01	11	11	11	11	11	11
15	11	00	11	01	11	01	11	10	11	01	11	11	11	01	11	11
16	11	01	11	00	11	00	11	11	11	00	11	00	11	00	11	10

FIG. 20F

OCT 2 8 2003
PATENT & TRADEMARK OFFICE

Symbol rate	Symbol #	Channel	Corresponding word : of length 16
8ksps	1	I-CH	C_1
		Q-CH	C_2
16, 32, 64, 128ksps	1	I-CH	C_1
		Q-CH	C_2
	3	I-CH	C_3
		Q-CH	C_4
256, 512, 1024ksps	1	I-CH	C_1
		Q-CH	C_2
	3	I-CH	C_3
		Q-CH	C_4
	5	I-CH	C_5
		Q-CH	C_6
	7	I-CH	C_7
		Q-CH	C_8
2048, 4096ksps	1	I-CH	C_1
		Q-CH	C_2
	3	I-CH	C_3
		Q-CH	C_4
	5	I-CH	C_5
		Q-CH	C_6
	7	I-CH	C_7
		Q-CH	C_8
	9	I-CH	C_9
		Q-CH	C_{10}
	11	I-CH	C_{11}
		Q-CH	C_{12}
	13	I-CH	C_{13}
		Q-CH	C_{14}
	15	I-CH	C_{15}
		Q-CH	C_{16}

FIG. 20G

OCT 2 8 2003
PATENT & TRADEMARK OFFICE

Symbol #	0	1	2	3
Slot #1	11	11	11	10
2	11	10	11	11
3	11	00	11	10
4	11	10	11	11
5	11	11	11	10
6	11	10	11	00
7	11	11	11	10
8	11	10	11	11
9	11	00	11	01
10	11	01	11	00
11	11	11	11	01
12	11	01	11	00
13	11	00	11	01
14	11	01	11	11
15	11	00	11	01
16	11	01	11	00

FIG. 20H

Symbol #	Channel	Corresponding word of length 16
1	I-CH	C_1
	Q-CH	C_2
3	I-CH	C_3
	Q-CH	C_4

FIG. 20I

OIPE JC139
OCT 2 8 2003
PATENT & TRADEMARK OFFICE

Frame Synchronization Words
L=15, Slot No. 1 2 3 4.....15
C_1=(1 0 0 0 1 1 1 1 0 1 0 1 1 0 0)
C_2=(1 0 1 0 0 1 1 0 1 1 1 0 0 0 0)
C_3=(1 1 0 0 0 1 0 0 1 1 0 1 0 1 1)
C_4=(0 0 1 0 1 0 0 0 0 1 1 1 0 1 1)
C_5=(1 1 1 0 1 0 1 1 0 0 1 0 0 0 1)
C_6=(1 1 0 1 1 1 0 0 0 0 1 0 1 0 0)
C_7=(1 0 0 1 1 0 1 0 1 1 1 1 0 0 0)
C_8=(0 0 0 0 0 1 1 1 0 1 1 0 0 1 0 1)

FIG. 21

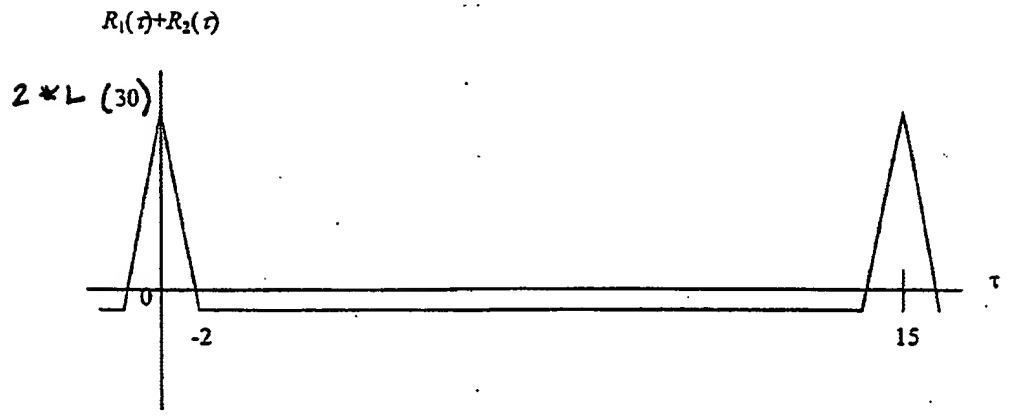

FIG. 22A

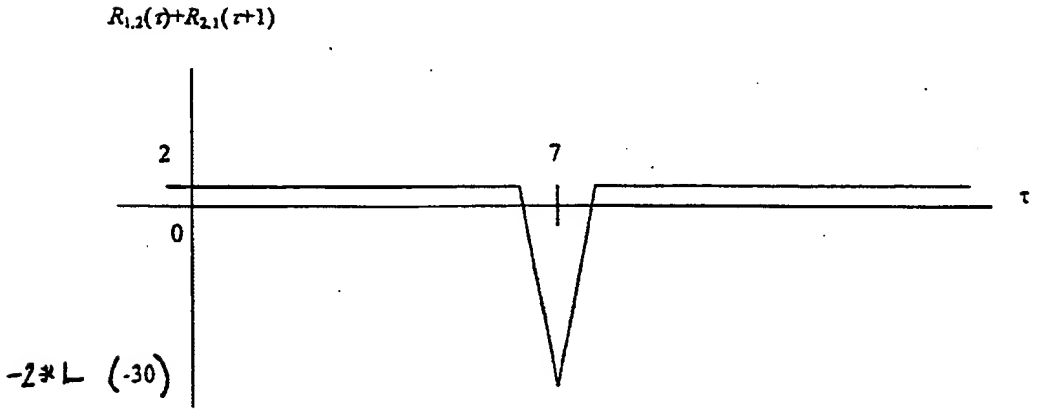

FIG. 22B

OCT 2 8 2003
PATENT & TRADEMARK OFFICE
TC1700

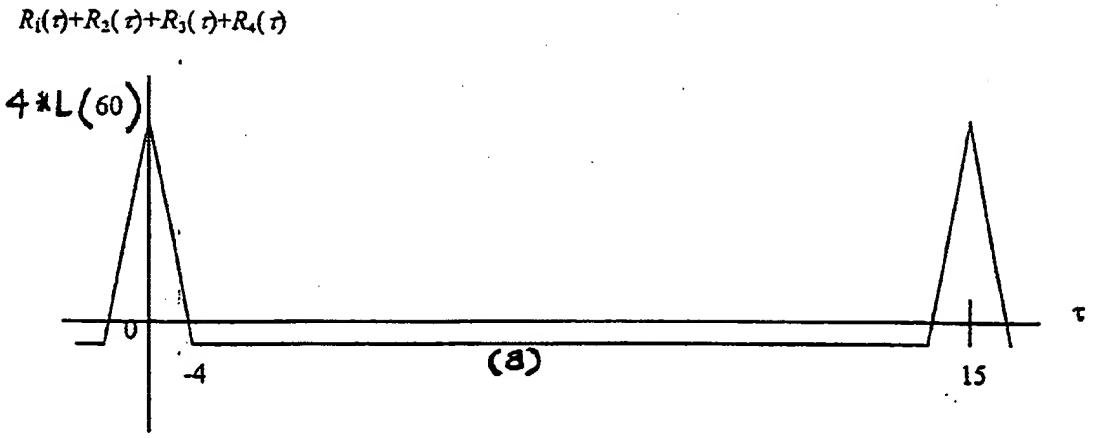

FIG. 22C

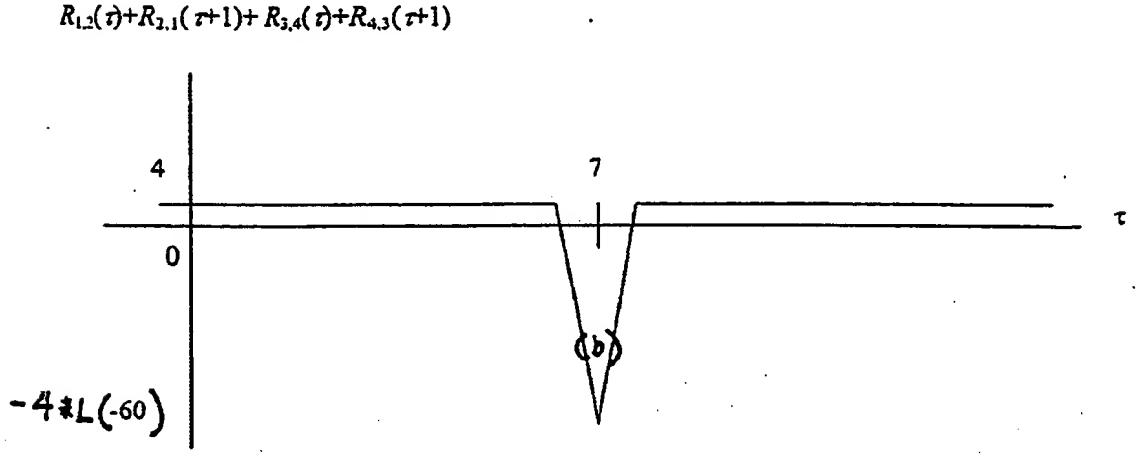

FIG. 22D

OIPE JC199
OCT 28 2003
PATENT & TRADEMARK OFFICE

	N_{pilot}=2		N_{pilot}=3			N_{pilot}=4			
Bit #	0	1	0	1	2	0	1	2	3
Slot #1	1	1	1	1	1	1	1	1	1
2	0	0	0	1	0	1	0	1	0
3	0	1	0	1	1	1	0	1	1
4	0	0	0	1	0	1	0	1	0
5	1	0	1	1	0	1	1	1	0
6	1	1	1	1	1	1	1	1	1
7	1	1	1	1	1	1	1	1	1
8	1	0	1	1	0	1	1	1	0
9	0	1	0	1	1	1	0	1	1
10	1	1	1	1	1	1	1	1	1
11	0	1	0	1	1	1	0	1	1
12	1	0	1	1	0	1	1	1	0
13	1	0	1	1	0	1	1	1	0
14	0	0	0	1	0	1	0	1	0
15	0	0	0	1	0	1	0	1	0

FIG. 23A

N_{pilot}	Pilot bit position #	Corresponding word of length 15
2	0	C_1
	1	C_2
3	0	C_1
	2	C_2
4	1	C_1
	3	C_2

FIG. 23B

OIPE JC139
OCT 2 8 2003
PATENT & TRADEMARK OFFICE

	N_{pilot}=2		N_{pilot}=3			N_{pilot}=4			
Bit #	0	1	0	1	2	0	1	2	3
Slot #1	1	1	1	1	1	1	1	1	1
2	1	0	0	1	0	1	0	1	0
3	1	1	0	1	1	1	0	1	1
4	1	0	0	1	0	1	0	1	0
5	1	0	1	1	0	1	1	1	0
6	1	1	1	1	1	1	1	1	1
7	1	1	1	1	1	1	1	1	1
8	1	0	1	1	0	1	1	1	0
9	1	1	0	1	1	1	0	1	1
10	1	1	1	1	1	1	1	1	1
11	1	1	0	1	1	1	0	1	1
12	1	0	1	1	0	1	1	1	0
13	1	0	1	1	0	1	1	1	0
14	1	0	0	1	0	1	0	1	0
15	1	0	0	1	0	1	0	1	0

FIG. 23C

N_{pilot}	Pilot bit position #	Corresponding word of length 15
2	1	C_1
3	0	C_1
	2	C_2
4	1	C_1
	3	C_2

FIG. 23D

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FIG. 23E

	$N_{pilot} = 5$					$N_{pilot} = 6$					
Bit #	0	1	2	3	4	0	1	2	3	4	5
Slot #1	1	1	1	1	0	1	1	1	1	1	0
2	0	0	1	1	0	1	0	0	1	1	0
3	0	1	1	0	1	1	0	1	1	0	1
4	0	0	1	0	0	1	0	0	1	0	0
5	1	0	1	0	1	1	1	0	1	0	1
6	1	1	1	1	0	1	0	1	1	1	0
7	1	1	1	0	0	1	1	1	1	0	0
8	1	0	1	0	0	1	1	0	1	0	0
9	0	1	1	1	0	1	0	1	1	1	0
10	1	1	1	1	1	1	1	1	1	1	1
11	0	1	1	0	1	1	0	1	1	0	1
12	1	0	1	1	1	1	1	0	1	1	1
13	1	0	1	0	0	1	1	0	1	0	0
14	0	0	1	1	1	1	0	0	1	1	1
15	0	0	1	1	1	1	0	0	1	1	1

	$N_{pilot} = 7$							$N_{pilot} = 8$							
Bit #	0	1	2	3	4	5	6	0	1	2	3	4	5	6	7
Slot #1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0
2	1	0	0	1	1	0	1	1	0	1	0	1	1	1	0
3	1	0	1	1	0	1	1	1	0	1	1	1	0	1	1
4	1	0	0	1	0	0	1	1	0	1	0	1	0	1	0
5	1	1	0	1	0	1	1	1	1	1	0	1	0	1	1
6	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0
7	1	1	1	1	0	0	1	1	1	1	1	1	0	1	0
8	1	1	0	1	0	0	1	1	1	1	0	1	0	1	0
9	1	0	1	1	1	0	1	1	0	1	1	1	1	1	0
10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
11	1	0	1	1	0	1	1	1	0	1	1	1	0	1	1
12	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1
13	1	1	0	1	0	0	1	1	1	1	0	1	0	1	0
14	1	0	0	1	1	1	1	1	0	1	0	1	1	1	1
15	1	0	0	1	1	1	1	1	0	1	0	1	1	1	1

FIG. 23F

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N_{pilot}	Pilot bit position #	Corresponding word of length 15
5	0	C_1
	1	C_2
	3	C_3
	4	C_4
6	1	C_1
	2	C_2
	4	C_3
	5	C_4
7	1	C_1
	2	C_2
	4	C_3
	5	C_4
8	1	C_1
	3	C_2
	5	C_3
	7	C_4

FIG. 23G

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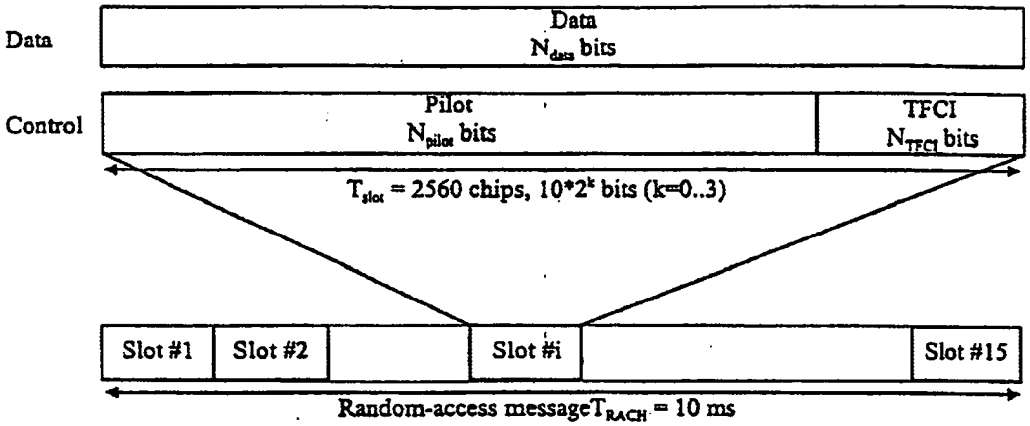

FIG. 23H

Channel Bit Rate (kbps)	Channel Symbol Rate (ksps)	SF	Bits/ Frame	Bits/ Slot	N_{pilot}	N_{TFCI}
15	15	256	150	10	8	2

FIG. 23I

Bit #	0	1	2	3	4	5	6	7
Slot #1	1	1	1	1	1	1	1	0
2	1	0	1	0	1	1	1	0
3	1	0	1	1	1	0	1	1
4	1	0	1	0	1	0	1	0
5	1	1	1	0	1	0	1	1
6	1	1	1	1	1	1	1	0
7	1	1	1	1	1	0	1	0
8	1	1	1	0	1	0	1	0
9	1	0	1	1	1	1	1	0
10	1	1	1	1	1	1	1	1
11	1	0	1	1	1	0	1	1
12	1	1	1	0	1	1	1	1
13	1	1	1	0	1	0	1	0
14	1	0	1	0	1	1	1	1
15	1	0	1	0	1	1	1	1

FIG. 23J

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	N_{pilot}=2	N_{pilot} = 4		N_{pilot} = 8				N_{pilot} = 16							
Symbol #	0	0	1	0	1	2	3	0	1	2	3	4	5	6	7
Slot #1	11	11	11	11	11	11	10	11	11	11	10	11	11	11	10
2	00	11	00	11	00	11	10	11	00	11	10	11	11	11	00
3	01	11	01	11	01	11	01	11	01	11	01	11	10	11	00
4	00	11	00	11	00	11	00	11	00	11	00	11	01	11	10
5	10	11	10	11	10	11	01	11	10	11	01	11	11	11	11
6	11	11	11	11	11	11	10	11	11	11	10	11	01	11	01
7	11	11	11	11	11	11	00	11	11	11	00	11	10	11	11
8	10	11	10	11	10	11	00	11	10	11	00	11	10	11	00
9	01	11	01	11	01	11	10	11	01	11	10	11	00	11	11
10	11	11	11	11	11	11	11	11	11	11	11	11	00	11	11
11	01	11	01	11	01	11	01	11	01	11	01	11	11	11	10
12	10	11	10	11	10	11	11	11	10	11	11	11	00	11	10
13	10	11	10	11	10	11	00	11	10	11	00	11	01	11	01
14	00	11	00	11	00	11	11	11	00	11	11	11	00	11	00
15	00	11	00	11	00	11	11	11	00	11	11	11	10	11	01

FIG. 24A

Symbol rate	Symbol #	Channel	Corresponding word of length 15
N_{pilot} = 2	0	I-CH	C_1
		Q-CH	C_2
N_{pilot} = 4	1	I-CH	C_1
		Q-CH	C_2
N_{pilot} = 8	1	I-CH	C_1
		Q-CH	C_2
	3	I-CH	C_3
		Q-CH	C_4
N_{pilot} = 16	1	I-CH	C_1
		Q-CH	C_2
	3	I-CH	C_3
		Q-CH	C_4
	5	I-CH	C_5
		Q-CH	C_6
	7	I-CH	C_7
		Q-CH	C_8

FIG. 24B

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	$N_{pilot} = 4$		$N_{pilot} = 8$				$N_{pilot} = 16$							
Symbol #	0	1	0	1	2	3	0	1	2	3	4	5	6	7
Slot #1	01	10	11	00	00	10	11	00	00	10	11	00	00	10
2	10	10	11	00	00	01	11	00	00	01	11	10	00	10
3	11	10	11	11	00	00	11	11	00	00	11	10	00	11
4	10	10	11	10	00	01	11	10	00	01	11	00	00	00
5	00	10	11	11	00	11	11	11	00	11	11	01	00	10
6	01	10	11	00	00	10	11	00	00	10	11	11	00	00
7	01	10	11	10	00	10	11	10	00	10	11	01	00	11
8	00	10	11	10	00	11	11	10	00	11	11	10	00	11
9	11	10	11	00	00	00	11	00	00	00	11	01	00	01
10	01	10	11	01	00	10	11	01	00	10	11	01	00	01
11	11	10	11	11	00	00	11	11	00	00	11	00	00	10
12	00	10	11	01	00	11	11	01	00	11	11	00	00	01
13	00	10	11	10	00	11	11	10	00	11	11	11	00	00
14	10	10	11	01	00	01	11	01	00	01	11	10	00	01
15	10	10	11	01	00	01	11	01	00	01	11	11	00	11

FIG. 24C

Symbol rate	Symbol #	Channel	Corresponding word of length 15
$N_{pilot} = 4$	0	I-CH	$-C_1$
		Q-CH	C_2
$N_{pilot} = 8$	1	I-CH	$-C_3$
		Q-CH	C_4
	3	I-CH	C_1
		Q-CH	$-C_2$
$N_{pilot} = 16$	1	I-CH	$-C_3$
		Q-CH	C_4
	3	I-CH	C_1
		Q-CH	$-C_2$
	5	I-CH	$-C_7$
		Q-CH	C_8
	7	I-CH	C_5
		Q-CH	$-C_6$

FIG. 24D

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	$N_{pilot} = 8$				$N_{pilot} = 16$							
Symbol #	0	1	2	3	0	1	2	3	4	5	6	7
Slot #1	11	11	11	10	11	11	11	10	11	11	11	10
2	11	00	11	10	11	00	11	10	11	11	11	00
3	11	01	11	01	11	01	11	01	11	10	11	00
4	11	00	11	00	11	00	11	00	11	01	11	10
5	11	10	11	01	11	10	11	01	11	11	11	11
6	11	11	11	10	11	11	11	10	11	01	11	01
7	11	11	11	00	11	11	11	00	11	10	11	11
8	11	10	11	00	11	10	11	00	11	10	11	00
9	11	01	11	10	11	01	11	10	11	00	11	11
10	11	11	11	11	11	11	11	11	11	00	11	11
11	11	01	11	01	11	01	11	01	11	11	11	10
12	11	10	11	11	11	10	11	11	11	00	11	10
13	11	10	11	00	11	10	11	00	11	01	11	01
14	11	00	11	11	11	00	11	11	11	00	11	00
15	11	00	11	11	11	00	11	11	11	10	11	01

FIG. 25A

Symbol rate	Symbol #	Channel	Corresponding word of length 15
$N_{pilot} = 8$	1	I-CH	C_1
		Q-CH	C_2
	3	I-CH	C_3
		Q-CH	C_4
$N_{pilot} = 16$	1	I-CH	C_1
		Q-CH	C_2
	3	I-CH	C_3
		Q-CH	C_4
	5	I-CH	C_5
		Q-CH	C_6
	7	I-CH	C_7
		Q-CH	C_8

FIG. 25B

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	$N_{pilot} = 8$				$N_{pilot} = 16$							
Symbol #	0	1	2	3	0	1	2	3	4	5	6	7
Slot #1	11	00	00	10	11	00	00	10	11	00	00	10
2	11	00	00	01	11	00	00	01	11	10	00	10
3	11	11	00	00	11	11	00	00	11	10	00	11
4	11	10	00	01	11	10	00	01	11	00	00	00
5	11	11	00	11	11	11	00	11	11	01	00	10
6	11	00	00	10	11	00	00	10	11	11	00	00
7	11	10	00	10	11	10	00	10	11	01	00	11
8	11	10	00	11	11	10	00	11	11	10	00	11
9	11	00	00	00	11	00	00	00	11	01	00	01
10	11	01	00	10	11	01	00	10	11	01	00	01
11	11	11	00	00	11	11	00	00	11	00	00	10
12	11	01	00	11	11	01	00	11	11	00	00	01
13	11	10	00	11	11	10	00	11	11	11	00	00
14	11	01	00	01	11	01	00	01	11	10	00	01
15	11	01	00	01	11	01	00	01	11	11	00	11

FIG. 25C

Symbol rate	Symbol #	Channel	Corresponding word of length 15
$N_{pilot} = 8$	1	I-CH	$-C_3$
		Q-CH	C_4
	3	I-CH	C_1
		Q-CH	$-C_2$
$N_{pilot} = 16$	1	I-CH	$-C_3$
		Q-CH	C_4
	3	I-CH	C_1
		Q-CH	$-C_2$
	5	I-CH	$-C_7$
		Q-CH	C_8
	7	I-CH	C_5
		Q-CH	$-C_6$

FIG. 25D

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Parameters	Uplink
Number of slots per frame	15
Number of bits in the DPCCH (Pilot/TPC/TFCI/FBI)	6/2/2/0
Number of bits in the DPDCH per each slot	10
Spreading factor (DPDCH)	256
Spreading factor (DPCCH)	256
Modulation	HPSK
3dB bandwidth	3.84MHz
Shaping filter	Root raised cosine (roll off 0.22)
Power amplifier	Ideal
Propagation channel	AWGN

FIG. 26A

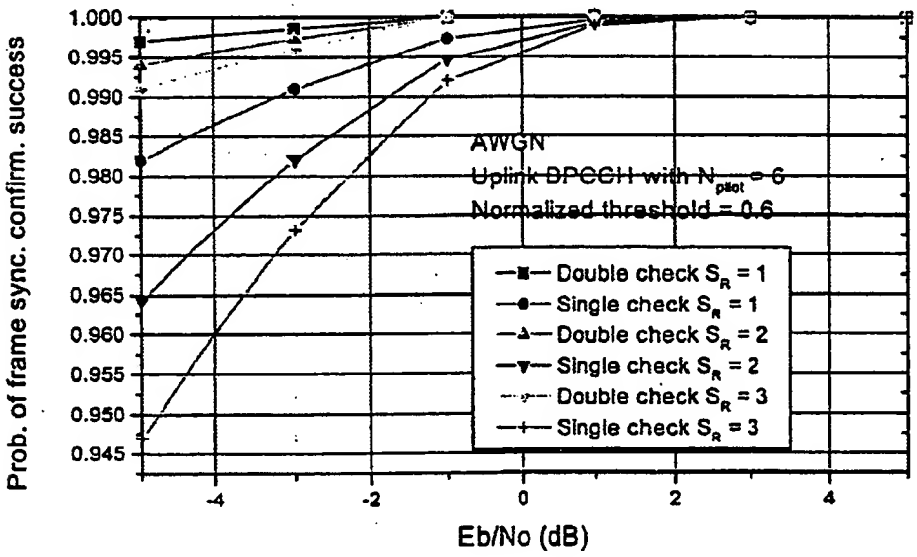

FIG. 26B

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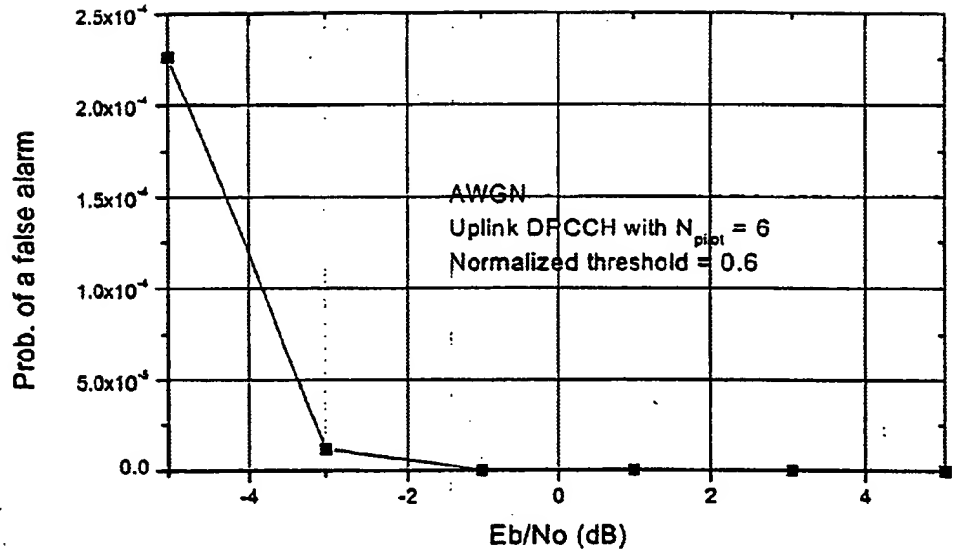

FIG. 26C

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FIG. 27

Item	15 slots	16 slots
No. of slots per frame	15	16
No. of N_{pilot} per slot	1) Uplink 2, 3, 4, 5, 6, 7, 8 2) Downlink 2, 4, 8, 16	1) Uplink 5, 6, 7, 8 2) Downlink 4, 8, 16, 32
Slot-Slot possible ?	Yes	Yes
Double-check possible?	Yes (Two correltors such as auto-correlator and cross-correlator are used)	Yes (Auto-correlator)
Single frame synchronization word can be used for frame synchronization ?	Yes since a frame synchronization word has –1 out-of-phase coefficients.	May not be feasible because of +4 or –4 out-of-phase coefficients. The +4 or –4 side lobes can be zero through some particular processing using preferred pair of frame synchronization words.
Frame synchronzation words	All 8 frame synchronization words are made out of a single PN code	All 8 frame synchronization words have +4 or –4 out-of-phase coefficient and minus peak value at middle shift.
Autocorrelation function	$R(\tau)=15$, $\tau=0$ $R(\tau)=-1$, elsewhere	$R(\tau)=16$, $\tau=0$ $R(\tau)=-16$, $\tau=8$ $R(\tau)=0,+4$, or -4, elsewhere